STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

SUPPLEMENTAL
LOAD CONDITION STUDIES

in cooperation with

U. S. BUREAU OF PUBLIC ROADS

DATA ON ROADWAY STRUCTURE AND ROADWAY CONDITION

AS SURVEYED FEBRUARY TO MAY, 1955

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ROADWAY STRUCTURE AND ROADWAY CONDITION
AS SURVEYED FEBRUARY TO MAY, 1955

Prepared by

MATERIALS AND RESEARCH DEPARTMENT

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Research No. 00258
Work Order No. 13NN26

November 1, 1955

INTRODUCTION

This supplemental report summarizes the changes that have taken place in selected sections of portland cement and bituminous pavements during a period of from three to three and one-half years.

A report dated August 13, 1953 gives complete descriptions of the pavements at the time of the original survey. The present report does not repeat details of structural section and drainage.

The original report covers 25 sections but 11 of them have been omitted in this supplementary report for reasons such as relocation of the highway, reconstruction of the highway or abandonment of the nearby loadometer station.

The sections included in this report are:

Portland Cement

Loadometer Sta. 5	X-S.J-66-A	Mossdale
" " 12	III-Col-7-B	Williams
" " 26	VI-Fre-4-C	Herndon
" " 32	IV-Ala-5-C	Greenville
" " 61	XI-S.D-2-D	Oceanside

Bituminous

Loadometer Sta. 14	II-Sha-3-B	Redding*
" " 21	IV-SCl-2-B	San Jose
" " 24	V-Mon-2-D	Soledad
" " 44	VII-Ven-2-C	Ventura
" " 50	VI-Ker-4-D	Bakersfield
" " 50	VI-Ker-4-D	Bakersfield
" " 67	VIII-Riv-26-C	Whitewater
" " 75	I-Hum-1-E	Scotia
" " 76	I-Hum-1-I	Arcata*
" " 79	II-Sis-72-A	Weed*

*These sections were reconstructed or repaired shortly after this supplementary survey was completed and will not be available for future study.

In making the original survey, longitudinal profiles were made of the portland cement sections and both longitudinal and transverse profiles were made of the bituminous pavements. In the supplemental survey, longitudinal profiles were made on both types of pavement and the results were compared with those of the original survey. No significant changes were found to have occurred in any of the sections and the profiles are not reproduced in this report. The records of both surveys are, however, on file in the office of the Materials and Research Department.

The sections included in this supplementary report are summarized on the following pages and are arranged in the order listed above.

Each section is 1000 feet in length and the total defects shown per section are comparable, one with the other.

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Loadometer Station No. 5
Road X-S.J-66-A
1000 foot test section

PAVEMENT CONDITION

	November, 1951	May, 1955
NUMBER OF CRACKED SLABS		
Right Lane	50 slabs	50 slabs
Left Lane	49 slabs	49 slabs
NUMBER OF CRACKS		
Right Lane	138 cracks	149 cracks
Left Lane	185 cracks	190 cracks
TOTAL FOOTAGE OF CRACKS		
Right Lane	827 feet	880 feet
Left Lane	1016 feet	1068 feet
FAULTING AT CRACKS		
Measured 18" from inner and outer ends of cracks		
Right Lane	None	None
Left Lane	None	None

FAULTING AT JOINTS

Measured 18" from inner and outer edges of lanes

		November, 1951	May, 1955
Right Lane	Inner:	Aver. 0.12" Total 6.07"	Aver. 0.17" Total 8.47"
	Outer:	Aver. 0.14" Total 6.96"	Aver. 0.18" Total 9.09"
Left Lane	Inner:	Aver. 0.11" Total 5.66"	Aver. 0.14" Total 7.01"
	Outer:	Aver. 0.12" Total 6.13"	Aver. 0.15" Total 7.53"

SHOULDER CONDITION

1951: Shoulders were in good condition.

1955: Shoulders were in generally good condition with the following exceptions. On the right there is a longitudinal crack approximately 6" from the edge of pavement throughout the section. On the left, approximately 6 inches from the edge of the pavement, there is a longitudinal crack from Sta. 241+00 to Sta. 244+00. Both shoulders have several transverse cracks, many of which are extensions of pavement cracks and joints.

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Loadometer Station No. 12
Road III-Col-7-B
1000 foot test section

PAVEMENT CONDITION

	October, 1951	May, 1955
NUMBER OF CRACKED SLABS		
Right Lane	33 slabs	45 slabs
Left Lane	16 slabs	28 slabs
NUMBER OF CRACKS		
Right Lane	40 cracks	55 cracks
Left Lane	16 cracks	28 cracks
TOTAL FOOTAGE OF CRACKS		
Right Lane	420 feet	624 feet
Left Lane	198 feet	336 feet

FAULTING AT CRACKS

Measured 18" from inner and outer ends of cracks

		October, 1951	May, 1955
Right Lane	Inner:	Aver. 0.03" Total 1.00"	Aver. 0.03" Total 1.46"
	Outer:	Aver. 0.02" Total 0.88"	Aver. 0.03" Total 1.77"
Left Lane	Inner:	Aver. 0.03" Total 0.50"	Aver. 0.03" Total 0.98"
	Outer:	Aver. 0.04" Total 0.61"	Aver. 0.03" Total 0.88"

FAULTING AT JOINTS

Measured 18" from inner and outer edges of lanes

		October, 1951	May, 1955
Right Lane	Inner:	Aver. 0.18" Total 8.81"	Aver. 0.24" Total 11.96"
	Outer:	Aver. 0.17" Total 8.62"	Aver. 0.23" Total 11.72"
Left Lane	Inner:	Aver. 0.15" Total 7.33"	Aver. 0.22" Total 11.11"
	Outer:	Aver. 0.15" Total 7.40"	Aver. 0.23" Total 11.60"

SHOULDER CONDITION

1951: The shoulders were in generally fair condition throughout the section.

1955: The shoulders are practically a total failure with the exception of the right shoulder from Sta. 488+70 to Sta. 490+00, and the left shoulder from Sta. 482+10 to Sta. 483+40 and from Sta. 485+00 to Sta. 486+50.

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Loadometer Station No. 26
Road VI-Fre-4-C
1000 foot test section

PAVEMENT CONDITION

	April, 1952	March, 1955
NUMBER OF CRACKED SLABS		
Right Lane	24 slabs	28 slabs
NUMBER OF CRACKS		
Right Lane	35 cracks	44 cracks
TOTAL FOOTAGE OF CRACKS		
Right Lane	360 feet	408 feet

FAULTING AT CRACKS

Measured 18" from inner and outer ends of cracks

		April, 1952	March, 1955
Right Lane	Inner:	Aver. 0.05" Total 1.78"	Aver. 0.08" Total 3.35"
	Outer:	Aver. 0.05" Total 1.77"	Aver. 0.07" Total 3.20"

FAULTING AT JOINTS

Measured 18" from inner and outer edges of lane

		April, 1952	March, 1955
Right Lane	Inner:	Aver. 0.07" Total 3.48"	Aver. 0.10" Total 5.15"
	Outer:	Aver. 0.06" Total 3.26"	Aver. 0.10" Total 5.34"

SHOULDER CONDITION

1952: The shoulder was in generally good condition throughout the section.

1955: The shoulder was in generally good condition with the exception of an area approximately one foot wide adjacent to the edge of pavement. This area of short transverse cracks is bounded by the edge of pavement and logitudinal cracks. The area extends the length of the section except from Sta. 353+90 to Sta. 354+30.

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Loadometer Station No. 32
Road IV-Ala-5-F
1000 foot test section

PAVEMENT CONDITION

	July, 1952	May, 1955
NUMBER OF CRACKED SLABS		
Right Outer Lane	3 slabs	11 slabs
Right Inner Lane	None	None
NUMBER OF CRACKS		
Right Outer Lane	3 cracks	11 cracks
Right Inner Lane	None	None
TOTAL FOOTAGE OF CRACKS		
Right Outer Lane	21 feet	91 feet
Right Inner Lane	None	None

FAULTING AT CRACKS

Measured 18" from inner and outer ends of cracks

		July, 1952	May, 1955
Right Outer Lane	Inner:	None	Aver. 0.06" Total 0.70"
	Outer:	Aver. 0.01" Total 0.03"	Aver. 0.01" Total 0.10"
Right Inner Lane	Inner:	None	None
	Outer:	None	None

FAULTING AT JOINTS

Measured 18" from inner and outer edges of lanes

		July, 1952	May, 1955
Right Outer Lane	Inner:	Aver. 0.04" Total 2.68"	Aver. 0.06" Total 3.84"
	Outer:	Aver. 0.05" Total 3.12"	Aver. 0.07" Total 4.87"
Right Inner Lane	Inner:	Aver. 0.02" Total 1.77"	Aver. 0.03" Total 2.31"
	Outer:	Aver. 0.02" Total 1.53"	Aver. 0.05" Total 3.04"

SHOULDER CONDITION

1952: Shoulders were in generally good condition except for a 3/4" opening between the shoulder and the pavement.

1955: Shoulders were in generally good condition. The 3/4" opening between shoulder and pavement has been sealed.

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Loadometer Station No. 61
Road XI-S.D-2-D
1000 foot test section

This section selected for test was substituted for the section on Road XI-S.D-2-C at Oceanside, and is established between Sta. "D" 291+00 and Sta. "D" 301+00, Road XI-S.D-2-D. The section is in the right outer lane of a four lane undivided highway. The roadway at the section is in fill from Sta. 291+00 to Sta. 294+15 and in cut from Sta. 294+15 to Sta. 301+00. Along the fill section there is a PMS berm at the edge of the 8' PMS shoulder. A downdrain at Sta. 291+35 handles the drainage from Sta. 291+00 to Sta. 300+00, and drainage from Sta. 300+00 is ahead, out of the section.

PAVEMENT CONDITION

February, 1955

NUMBER OF CRACKED SLABS

Right Outer Lane — None

NUMBER OF CRACKS

Right Outer Lane — None

TOTAL FOOTAGE OF CRACKS

Right Outer Lane — None

FAULTING AT CRACKS

Right Outer Lane — None

FAULTING AT JOINTS

Measured 18" from inner and outer edges of lane

Right Outer Lane

Inner: Aver. 0.004"
Total 0.03"
Outer: Aver. 0.004"
Total 0.29"

SHOULDER CONDITION

The asphaltic mix shoulder on the right is in generally good condition.

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Loadometer Station No. 14
Road II-Sha-3-B
1000 foot test section

PAVEMENT CONDITION

	September, 1951	May, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	115 feet	621 feet
Left Lane	71 feet	672 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	577 sq. ft.	497 sq. ft.
Left Lane	622 sq. ft.	500 sq. ft.
AREA OF BLOCK CRACKING		
Right Lane	None	543 sq. ft.
Left Lane	None	615 sq. ft.
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	None	80 sq. ft.
Left Lane	None	122 sq. ft.
TOTAL AREA OF FAILURE		
Right Lane	577 sq. ft.	1120 sq. ft.
Left Lane	622 sq. ft.	1237 sq. ft.

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right Shoulder	None	28 feet
Left Shoulder	None	25 feet

There are no other signs of shoulder failure.

Research No. 00258
Work Order No. 13NN26

Loadometer Station No. 21
Road IV-SC1-2-B
1000 foot test section

PAVEMENT CONDITION

	August, 1952	February, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	297 feet	511 feet
Center Lane	8 feet	15 feet
Left Lane	265 feet	305 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Center Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	None	20 sq. ft.
Center Lane	None	None
Left Lane	None	10 sq. ft.
AREA OF SHOVING		
Right Lane	None	None
Center Lane	None	None
Left Lane	24 sq. ft.	24 sq.ft.
AREA OF PATCHES		
Right Lane	None	646 sq. ft.
Center Lane	None	2100 sq. ft.
Left Lane	None	198 sq. ft.
TOTAL AREA OF FAILURE		
Right Lane	None	666 sq. ft.
Center Lane	None	2100 sq. ft.
Left Lane	24 sq. ft.	232 sq. ft.

SHOULDER CONDITION

There are no cracks or failed areas on the shoulders.

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Loadometer Station No. 24
Road V-Mon-2-C
1000 foot test section

PAVEMENT CONDITION

	October, 1952	February, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	368 feet	607 feet
Left Lane	187 feet	273 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	288 sq. ft.	332 sq. ft.
Left Lane	192 sq. ft.	433 sq. ft.
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	18 sq. ft.	160 sq. ft.
Left Lane	None	121 sq. ft.
TOTAL AREA OF FAILURE		
Right Lane	306 sq. ft.	492 sq. ft.
Left Lane	192 sq. ft.	554 sq. ft.

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right Shoulder	910 feet	1020 feet
Left Shoulder	344 feet	409 feet
AREA OF ALLIGATOR CRACKING		
Right Shoulder	None	None
Left Shoulder	None	None
AREA OF BLOCK CRACKING		
Right Shoulder	65 sq. ft.	230 sq. ft.
Left Shoulder	35 sq. ft.	72 sq. ft.

Loadometer Station No. 24
Road V-Mon-2-C

Shoulder Condition (Continued)

	AREA OF SHOVING	
Right Shoulder	570 sq. ft.	570 sq. ft.
Left Shoulder	None	None
	AREA OF PATCHES	
Right Shoulder	None	None
Left Shoulder	None	None
	TOTAL AREA OF FAILURE	
Right Shoulder	635 sq. ft.	800 sq. ft.
Left Shoulder	35 sq. ft.	72 sq. ft.

Research No. 00258
Work Order No. 13NN26

Loadometer Station No. 44
Road VII-Ven-2-C
1000 foot test section

PAVEMENT CONDITION

	February, 1951	February, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	None	717 feet
Left Lane	None	None
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	None	None
Left Lane	None	84 sq. ft.
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	None	None
Left Lane	None	None
TOTAL AREA OF FAILURE		
Right Lane	None	None
Left Lane	None	84 sq. ft.

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right Shoulder	None	810 feet
Left Shoulder	None	None

There are no other signs of shoulder failure.

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Loadometer Station No. 50
Road VI-Ker-4-D
Sta. 290+00 to Sta. 300+00
1000 foot test section

PAVEMENT CONDITION

	May, 1952	March, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	252 feet	437 feet
Left Lane	91 feet	312 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	None	None
Left Lane	None	None
TOTAL AREA OF FAILURE		
Right Lane	None	None
Left Lane	None	None

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right Shoulder	21 feet	100 feet
Left Shoulder	4 feet	23 feet
AREA OF ALLIGATOR CRACKING		
Right Shoulder	None	None
Left Shoulder	None	None
AREA OF BLOCK CRACKING		
Right Shoulder	None	465 sq. ft.
Left Shoulder	None	90 sq. ft.

Loadometer Station No. 50
Road VI-Ker-4-D
Sta. 290+00 to Sta. 300+00

Shoulder Condition (Continued)

	AREA OF SHOVING	
Right Shoulder	None	None
Left Shoulder	None	None
	AREA OF PATCHES	
Right Shoulder	None	350 sq. ft.
Left Shoulder	None	65 sq. ft.
	TOTAL AREA OF FAILURE	
Right Shoulder	None	815 sq. ft.
Left Shoulder	None	155 sq. ft.

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Loadometer Sta. No. 50
Road VI-Ker-4-D
Sta. 330+00 to Sta. 340+00
1000 foot test section

PAVEMENT CONDITION

	May, 1952	March, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	683 feet	1134 feet
Left Lane	847 feet	1197 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	20 sq. ft.	45 sq. ft.
AREA OF BLOCK CRACKING		
Right Lane	None	None
Left Lane	201 sq. ft.	124 sq. ft.
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	None	None
Left Lane	None	205 sq. ft.
TOTAL AREA OF FAILURE		
Right Lane	None	None
Left Lane	221 sq. ft.	374 sq.ft.

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right Shoulder	8 feet	116 feet
Left Shoulder	15 feet	160 feet
AREA OF ALLIGATOR CRACKING		
Right Shoulder	None	None
Left Shoulder	20 sq. ft.	60 sq. ft.
AREA OF BLOCK CRACKING		
Right Shoulder	None	None
Left Shoulder	140 sq. ft.	None

Loadometer Sta. No. 50
Road VI-Ker-4-D
Sta. 330+00 to Sta. 340+00

Shoulder Condition (Continued)

	AREA OF SHOVING	
Right Shoulder	None	None
Left Shoulder	None	None
	AREA OF PATCHES	
Right Shoulder	None	None
Left Shoulder	None	195 sq. ft.
	TOTAL AREA OF FAILURE	
Right Shoulder	None	None
Left Shoulder	160 sq. ft.	255 sq. ft.

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Loadometer Station No. 67
Road VIII-Riv-26-C
1000 foot test section

PAVEMENT CONDITION

	May, 1951	February, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	1094 feet	1390 feet
Left Lane	1303 feet	1431 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	None	None
Left Lane	None	2000 sq. ft.
TOTAL AREA OF FAILURE		
Right Lane	None	None
Left Lane	None	2000 sq. ft.

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right Shoulder	120 feet	165 feet
Left Shoulder	7 feet	97 feet

There are no other signs of shoulder failure.

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Loadometer Station No. 75
Road I-Hum-1-E
1000 foot test section

PAVEMENT CONDITION

	August, 1951	May, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	181 feet	245 feet
Left Lane	5 feet	5 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	None	None
Left Lane	None	None
TOTAL AREA OF FAILURE		
Right Lane	None	None
Left Lane	None	None

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right shoulder	182 feet	343 feet
Left shoulder	292 feet	482 feet

There are no other signs of shoulder failure

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Loadometer Station No. 76
Road I-Hum-1-I
1000 foot test section

PAVEMENT CONDITION

	August, 1951	May, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	48 feet	80 feet
Left Lane	None	None
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF SHOVING		
Right Lane	None	None
Left Lane	None	None
AREA OF PATCHES		
Right Lane	None	None
Left Lane	None	None
TOTAL AREA OF FAILURE		
Right Lane	None	None
Left Lane	None	None

SHOULDER CONDITION

FOOTAGE OF SINGLE CRACKS		
Right shoulder	None	782 feet
Left Shoulder	None	498 feet

All cracks are longitudinal.

There are no other signs of shoulder failure.

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Loadometer Station No. 79
Road II-Sis-72-A
1000 foot test section

PAVEMENT CONDITION

	September, 1951	May, 1955
FOOTAGE OF SINGLE CRACKS		
Right Lane	253 feet	357 feet
Left Lane	46 feet	451 feet
AREA OF ALLIGATOR CRACKING		
Right Lane	None	None
Left Lane	None	None
AREA OF BLOCK CRACKING		
Right Lane	None	6194 sq. ft.
Left Lane	None	2874 sq. ft.
AREA OF SHOVING		
Right Lane	None	None
Left Lane	28 sq. ft.	None
AREA OF PATCHES		
Right Lane	None	None
Left Lane	None	None
TOTAL AREA OF FAILURE		
Right Lane	None	6194 sq. ft.
Left Lane	28 sq. ft.	2874 sq. ft.

SHOULDER CONDITION

There are no shoulders within this section.